Chapter Outline and Learning Objectives

2.1 Production Possibilities Frontiers and Opportunity Costs, page 40
   Use a production possibilities frontier to analyze opportunity costs and trade-offs.

2.2 Comparative Advantage and Trade, page 46
   Understand comparative advantage and explain how it is the basis for trade.

2.3 The Market System, page 51
   Explain the basic idea of how a market system works.
Economics in Your Life

The Trade-offs When You Buy a Car

When you buy a car, you probably consider factors such as safety and fuel efficiency. To increase fuel efficiency, automobile manufacturers make cars small and light. Large cars absorb more of the impact of an accident than do small cars. As a result, people are usually safer driving large cars than small cars. What can we conclude from these facts about the relationship between safety and fuel efficiency? Under what circumstances would it be possible for automobile manufacturers to make cars safer and more fuel efficient? As you read the chapter, see if you can answer these questions. You can check your answers against those provided on page 58 at the end of this chapter.
In a market system, managers at most firms must make decisions like those made by BMW’s managers. The decisions managers face reflect a key fact of economic life: 

**Scarcity requires trade-offs.** Scarcity exists because we have unlimited wants but only limited resources available to fulfill those wants. Goods and services are scarce. So, too, are the economic resources, or factors of production—workers, capital, natural resources, and entrepreneurial ability—used to make goods and services. Your time is scarce, which means you face trade-offs: If you spend an hour studying for an economics exam, you have one less hour to spend studying for a psychology exam or going to the movies. If your university decides to use some of its scarce budget to buy new computers for the computer labs, those funds will not be available to buy new books for the library or to resurface the student parking lot. If BMW decides to devote some of the scarce workers and machinery in its Spartanburg assembly plant to producing more X6 hybrid cars, those resources will not be available to produce more X5 SUVs.

Households and firms make many of their decisions in markets. Trade is a key activity that takes place in markets. Trade involves the decisions of millions of households and firms spread around the world. By engaging in trade, people can raise their standard of living. In this chapter, we provide an overview of how the market system coordinates the independent decisions of these millions of households and firms. We begin our analysis of the economic consequences of scarcity and the working of the market system by introducing an important economic model: the **production possibilities frontier**.

### Production Possibilities Frontiers and Opportunity Costs

As we saw in the chapter opener, BMW operates an automobile factory in Spartanburg, South Carolina, where it assembles several car models. Because the firm’s resources—workers, machinery, materials, and entrepreneurial skills—are limited, BMW faces a trade-off: Resources devoted to producing one model are not available for producing other models. Chapter 1 explained that economic models can be useful in analyzing many questions. We can use a simple model called the **production possibilities frontier** to analyze the trade-offs BMW faces in its Spartanburg plant. A **production possibilities frontier (PPF)** is a curve showing the maximum attainable combinations of two products that may be produced with available resources and current technology. In BMW’s case, we simplify by assuming that the company produces only X6 hybrids and X5 SUVs at the Spartanburg plant, using workers, materials, robots, and other machinery.

### Graphing the Production Possibilities Frontier

Figure 2.1 uses a production possibilities frontier to illustrate the trade-offs that BMW faces. The numbers from the table are plotted in the graph. The line in the graph is BMW’s production possibilities frontier. If BMW uses all its resources to produce hybrids, it can produce 800 per day—point A at one end of the production possibilities frontier. If BMW uses all its resources to produce SUVs, it can produce 800 per day—point E at the other end of the production possibilities frontier. If BMW devotes resources to producing both vehicles, it could be at a point like B, where it produces 600 hybrids and 200 SUVs.

All the combinations either on the frontier—like A, B, C, D, and E—or inside the frontier—like point F—are **attainable** with the resources available. Combinations on the frontier are **efficient** because all available resources are being fully utilized, and the
fewest possible resources are being used to produce a given amount of output. Combinations inside the frontier—like point $F$—are inefficient because maximum output is not being obtained from the available resources—perhaps because the assembly line is not operating at capacity. BMW might like to be beyond the frontier—at a point like $G$, where it would be producing 600 hybrids and 500 SUVs—but points beyond the production possibilities frontier are unattainable, given the firm’s current resources. To produce the combination at $G$, BMW would need more machines or more workers.

Notice that if BMW is producing efficiently and is on the production possibilities frontier, the only way to produce more of one vehicle is to produce fewer of the other vehicle. Recall from Chapter 1 that the opportunity cost of any activity is the highest-valued alternative that must be given up to engage in that activity. For BMW, the opportunity cost of producing one more SUV is the number of hybrids the company will not be able to produce because it has shifted those resources to producing SUVs. For example, in moving from point $B$ to point $C$, the opportunity cost of producing 200 more SUVs per day is the 200 fewer hybrids that can be produced.

What point on the production possibilities frontier is best? We can’t tell without further information. If consumer demand for SUVs is greater than the demand for hybrids, the company is likely to choose a point closer to $E$. If demand for hybrids is greater than demand for SUVs, the company is likely to choose a point closer to $A$. 

**Figure 2.1 BMW’s Production Possibilities Frontier**

BMW faces a trade-off: To build one more hybrid, it must build one less SUV. The production possibilities frontier illustrates the trade-off BMW faces. Combinations on the production possibilities frontier—like points $A$, $B$, $C$, $D$, and $E$—are technically efficient because the maximum output is being obtained from the available resources. Combinations inside the frontier—like point $F$—are inefficient because some resources are not being used. Combinations outside the frontier—like point $G$—are unattainable with current resources.

**Opportunity cost** The highest-valued alternative that must be given up to engage in an activity.
Solved Problem 2.1

Drawing a Production Possibilities Frontier for Rosie’s Boston Bakery

Rosie’s Boston Bakery specializes in cakes and pies. Rosie has 5 hours per day to devote to baking. In 1 hour, Rosie can prepare 2 pies or 1 cake.

1. Use the information given to complete the following table:

<table>
<thead>
<tr>
<th>Choice</th>
<th>Hours Spent Making</th>
<th>Quantity Made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cakes</td>
<td>Pies</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Use the data in the table to draw a production possibilities frontier graph illustrating Rosie’s trade-offs between making cakes and making pies. Label the vertical axis “Quantity of cakes made.” Label the horizontal axis “Quantity of pies made.” Make sure to label the values where Rosie’s production possibilities frontier intersects the vertical and horizontal axes.

3. Label the points representing choice D and choice E. If Rosie is at choice D, what is her opportunity cost of making more pies?

Solving the Problem

**Step 1:** Review the chapter material. This problem is about using production possibilities frontiers to analyze trade-offs, so you may want to review the section “Graphing the Production Possibilities Frontier,” which begins on page 40.

**Step 2:** Answer part (a) by filling in the table. If Rosie can produce 1 cake in 1 hour, then with choice A, she will make 5 cakes and 0 pies. Because she can produce 2 pies in 1 hour, with choice B, she will make 4 cakes and 2 pies. Using similar reasoning, you can fill in the remaining cells in the table as follows:

<table>
<thead>
<tr>
<th>Choice</th>
<th>Hours Spent Making</th>
<th>Quantity Made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cakes</td>
<td>Pies</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

**Step 3:** Answer part (b) by drawing the production possibilities frontier graph. Using the data in the table in Step 2, you should draw a graph that looks like this:
If Rosie devotes all 5 hours to making cakes, she will make 5 cakes. Therefore, her production possibilities frontier will intersect the vertical axis at 5 cakes made. If Rosie devotes all 5 hours to making pies, she will make 10 pies. Therefore, her production possibilities frontier will intersect the horizontal axis at 10 pies made.

**Step 4:** Answer part (c) by showing choices D and E on your graph. The points for choices D and E can be plotted using the information from the table:

<table>
<thead>
<tr>
<th>Quantity of cakes made</th>
<th>Quantity of pies made</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Moving from choice D to choice E increases Rosie’s production of pies by 2 but lowers her production of cakes by 1. Therefore, her opportunity cost of making 2 more pies is making 1 less cake.

**Your Turn:** For more practice, do related problem 1.9 on page 63 at the end of this chapter.
164,000 people become uninsured. Of course, people without health insurance can still visit the doctor and obtain prescriptions, but they have to pay higher prices than do people with insurance. Although the consequences of being uninsured can be severe, particularly if someone develops a serious illness, economists are not surprised that higher prices for health insurance lead to less health insurance being purchased: Faced with limited incomes, people have to make choices among the goods and services they buy.

The Congressional Budget Office estimates that as the U.S. population ages and medical costs continue to rise, federal government spending on Medicare will more than double over the next 10 years. Many policymakers are concerned that this rapid increase in Medicare spending will force a reduction in spending on other government programs. Daniel Callahan, a researcher at the Hastings Center for Bioethics, has argued that policymakers should consider taking some dramatic steps, such as having Medicare stop paying for open-heart surgery and other expensive treatments for people over 80 years of age. Callahan argues that the costs of open-heart surgery and similar treatments for the very old exceed the benefits, and the funds would be better spent on treatments for younger patients, where the benefits would exceed the costs. Spending less on prolonging the lives of the very old in order to save resources that can be used for other purposes is a very painful trade-off to consider. But in a world of scarcity, trade-offs of some kind are inevitable.


MyEconLab Your Turn: Test your understanding by doing related problems 1.10, 1.11, 1.12, and 1.13 on page 63 at the end of this chapter.

Increasing Marginal Opportunity Costs

We can use the production possibilities frontier to explore issues concerning the economy as a whole. For example, suppose we divide all the goods and services produced in the economy into just two types: military goods and civilian goods. In Figure 2.2, we let tanks represent military goods and automobiles represent civilian goods. If all the country’s resources are devoted to producing military goods, 400 tanks can be produced in one year. If all resources are devoted to producing civilian goods, 500 automobiles can be produced in one year. Devoting resources to producing both goods results in the economy being at other points along the production possibilities frontier.

Notice that this production possibilities frontier is bowed outward rather than being a straight line. Because the curve is bowed out, the opportunity cost of automobiles in terms of tanks depends on where the economy currently is on the production possibilities frontier. For example, to increase automobile production from 0 to 200—moving from point A to point B—the economy has to give up only 50 tanks. But to increase...
automobile production by another 200 vehicles—moving from point $B$ to point $C$—the economy has to give up 150 tanks.

As the economy moves down the production possibilities frontier, it experiences increasing marginal opportunity costs because increasing automobile production by a given quantity requires larger and larger decreases in tank production. Increasing marginal opportunity costs occur because some workers, machines, and other resources are better suited to one use than to another. At point $A$, some resources that are well suited to producing automobiles are forced to produce tanks. Shifting these resources into producing automobiles by moving from point $A$ to point $B$ allows a substantial increase in automobile production, without much loss of tank production. But as the economy moves down the production possibilities frontier, more and more resources that are better suited to tank production are switched into automobile production. As a result, the increases in automobile production become increasingly smaller, while the decreases in tank production become increasingly larger. We would expect in most situations that production possibilities frontiers will be bowed outward rather than linear, as in the BMW example discussed earlier.

The idea of increasing marginal opportunity costs illustrates an important economic concept: The more resources already devoted to an activity, the smaller the payoff to devoting additional resources to that activity. For example, the more hours you have already spent studying economics, the smaller the increase in your test grade from each additional hour you spend—and the greater the opportunity cost of using the hour in that way. The more funds a firm has devoted to research and development during a given year, the smaller the amount of useful knowledge it receives from each additional dollar—and the greater the opportunity cost of using the funds in that way. The more funds the federal government spends cleaning up the environment during a given year, the smaller the reduction in pollution from each additional dollar—and, once again, the greater the opportunity cost of using the funds in that way.

**Economic Growth**

At any given time, the total resources available to any economy are fixed. Therefore, if the United States produces more automobiles, it must produce less of something else—tanks in our example. Over time, though, the resources available to an economy may increase. For example, both the labor force and the capital stock—the amount of physical capital available in the country—may increase. The increase in the available labor force and the capital stock shifts the production possibilities frontier outward for the U.S. economy and makes it possible to produce both more automobiles and more
tanks. Panel (a) of Figure 2.3 shows that the economy can move from point A to point B, producing more tanks and more automobiles.

Similarly, technological change makes it possible to produce more goods with the same number of workers and the same amount of machinery, which also shifts the production possibilities frontier outward. Technological change need not affect all sectors equally. Panel (b) of Figure 2.3 shows the results of technological change in the automobile industry that increases the quantity of automobiles workers can produce per year while leaving unchanged the quantity of tanks that can be produced.

Shifts in the production possibilities frontier represent economic growth because they allow the economy to increase the production of goods and services, which ultimately raises the standard of living. In the United States and other high-income countries, the market system has aided the process of economic growth, which over the past 200 years has greatly increased the well-being of the average person.

**Comparative Advantage and Trade**

We can use the ideas of production possibilities frontiers and opportunity costs to understand the basic economic activity of trade. Markets are fundamentally about trade, which is the act of buying and selling. Sometimes we trade directly, as when children trade one baseball card for another baseball card. But often we trade indirectly: We sell our labor services as, say, an accountant, a salesperson, or a nurse for money, and then we use the money to buy goods and services. Although in these cases, trade takes place indirectly, ultimately the accountant, salesperson, or nurse is trading his or her services for food, clothing, and other goods and services. One of the great benefits of trade is that it makes it possible for people to become better off by increasing both their production and their consumption.

**Specialization and Gains from Trade**

Consider the following situation: You and your neighbor both have fruit trees on your property. Initially, suppose you have only apple trees and your neighbor has only cherry trees. In this situation, if you both like apples and cherries, there is an obvious opportunity for both of you to gain from trade: You trade some of your apples for some of your neighbor’s cherries, making you both better off. But what if there are apple and cherry trees growing on both of your properties? In that case, there can still be gains from trade. For example, your neighbor might be very good at picking apples, and you might be very good at picking cherries. It would make sense for your neighbor to concentrate on picking apples and for you to concentrate on picking cherries. You can then trade some of the cherries you pick for some of the apples your neighbor picks. But what if your neighbor is actually better at picking both apples and cherries than you are?

We can use production possibilities frontiers (PPFs) to show how your neighbor can benefit from trading with you even though she is better than you are at picking both apples and cherries. (For simplicity, and because it will not have any effect on the conclusions we draw, we will assume that the PPFs in this example are straight lines.) The table in Figure 2.4 shows how many apples and how many cherries you and your neighbor can pick in one week. The graph in the figure uses the data from the table to construct PPFs. Panel (a) shows your PPF. If you devote all your time to picking apples, you can pick 20 pounds of apples per week. If you devote all your time to picking cherries, you can pick 20 pounds per week. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

The production possibilities frontiers in Figure 2.4 show how many apples and cherries you and your neighbor can consume, without trade. Suppose that when you don’t trade with your neighbor, you pick and consume 8 pounds of apples and 12 pounds of cherries per week. This combination of apples and cherries is represented by point A in panel (a) of Figure 2.5. When your neighbor doesn’t trade with you, she picks and consumes 9 pounds of apples and 42 pounds of cherries per week. This combination of apples and cherries is represented by point C in panel (b) of Figure 2.5.
After years of picking and consuming your own apples and cherries, suppose your neighbor comes to you one day with the following proposal: She offers to trade you 15 pounds of her cherries for 10 pounds of your apples next week. Should you accept this offer? You should accept because you will end up with more apples and more cherries to consume. To take advantage of her proposal, you should specialize in picking only apples rather than splitting your time between picking apples and picking cherries. We know this will allow you to pick 20 pounds of apples. You can trade 10 pounds of your apples for 15 pounds of your neighbor’s cherries, you can pick 20 pounds. If you devote all your time to picking cherries, you can pick 20 pounds. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

<table>
<thead>
<tr>
<th>Devote all time to picking apples</th>
<th>Devote all time to picking cherries</th>
</tr>
</thead>
<tbody>
<tr>
<td>You</td>
<td>Your Neighbor</td>
</tr>
<tr>
<td>Apples</td>
<td>Cherries</td>
</tr>
<tr>
<td>20 pounds</td>
<td>0 pounds</td>
</tr>
<tr>
<td>0 pounds</td>
<td>20 pounds</td>
</tr>
</tbody>
</table>

Figure 2.4  Production Possibilities for You and Your Neighbor, without Trade

The table in this figure shows how many pounds of apples and how many pounds of cherries you and your neighbor can each pick in one week. The graphs in the figure use the data from the table to construct production possibilities frontiers (PPFs) for you and your neighbor. Panel (a) shows your PPF. If you devote all your time to picking apples and none of your time to picking cherries, you can pick 20 pounds. If you devote all your time to picking cherries, you can pick 20 pounds. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

After years of picking and consuming your own apples and cherries, suppose your neighbor comes to you one day with the following proposal: She offers to trade you 15 pounds of her cherries for 10 pounds of your apples next week. Should you accept this offer? You should accept because you will end up with more apples and more cherries to consume. To take advantage of her proposal, you should specialize in picking only apples rather than splitting your time between picking apples and picking cherries. We know this will allow you to pick 20 pounds of apples. You can trade 10 pounds of your apples for 15 pounds of your neighbor’s cherries, you can pick 20 pounds. If you devote all your time to picking cherries, you can pick 20 pounds. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

Figure 2.5  Gains from Trade

When you don’t trade with your neighbor, you pick and consume 8 pounds of apples and 12 pounds of cherries per week—point A in panel (a). When your neighbor doesn’t trade with you, she picks and consumes 9 pounds of apples and 42 pounds of cherries per week—point C in panel (b). If you specialize in picking apples, you can pick 20 pounds. If your neighbor specializes in picking cherries, she can pick 60 pounds. If you trade 10 pounds of your apples for 15 pounds of your neighbor’s cherries, you will be able to consume 10 pounds of apples and 15 pounds of cherries—point B in panel (a). Your neighbor can now consume 10 pounds of apples and 45 pounds of cherries—point D in panel (b). You and your neighbor are both better off as a result of the trade.
of apples to your neighbor for 15 pounds of her cherries. The result is that you will be able to consume 10 pounds of apples and 15 pounds of cherries (point B in panel (a) of Figure 2.5). You are clearly better off as a result of trading with your neighbor: You now can consume 2 more pounds of apples and 3 more pounds of cherries than you were consuming without trading. You have moved beyond your PPF.

Your neighbor has also benefited from the trade. By specializing in picking only cherries, she can pick 60 pounds. She trades 15 pounds of cherries to you for 10 pounds of apples. The result is that she can consume 10 pounds of apples and 45 pounds of cherries (point D in panel (b) of Figure 2.5). This is 1 more pound of apples and 3 more pounds of cherries than she was consuming before trading with you. She also has moved beyond her PPF. Table 2.1 summarizes the changes in production and consumption that result from your trade with your neighbor. (In this example, we chose one specific rate of trading cherries for apples—15 pounds of cherries for 10 pounds of apples. There are, however, many other rates of trading cherries for apples that would also make you and your neighbor better off.)

### Absolute Advantage versus Comparative Advantage

Perhaps the most remarkable aspect of the preceding example is that your neighbor benefits from trading with you even though she is better than you at picking both apples and cherries. **Absolute advantage** is the ability of an individual, a firm, or a country to produce more of a good or service than competitors, using the same amount of resources. Your neighbor has an absolute advantage over you in producing both apples and cherries because she can pick more of each fruit than you can in the same amount of time. Although it seems that your neighbor should pick her own apples and her own cherries, we have just seen that she is better off specializing in cherry picking and leaving the apple picking to you.

We can consider further why both you and your neighbor benefit from specializing in picking only one fruit. First, think about the opportunity cost to each of you of picking the two fruits. We saw from the PPF in Figure 2.4 that if you devoted all your time to picking apples, you would be able to pick 20 pounds of apples per week. As you move down your PPF and shift time away from picking apples to picking cherries, you have to give up 1 pound of apples for each pound of cherries you pick (the slope of your PPF is $-1$). For a review of calculating slopes, see the appendix to Chapter 1.) Therefore, your opportunity cost of picking 1 pound of cherries is 1 pound of apples. By the same reasoning, your opportunity cost of picking 1 pound of apples is 1 pound of cherries. Your neighbor’s PPF has a different slope, so she faces a different trade-off: As she shifts time from picking apples to picking cherries, she has to give up 0.5 pound of apples for every 1 pound of cherries she picks (the slope of your neighbor’s PPF is $-0.5$). As she shifts time from picking cherries to picking apples, she gives up 2 pounds of cherries for every 1 pound of apples she picks. Therefore, her opportunity cost of picking 1 pound of apples is 2 pounds of cherries, and her opportunity cost of picking 1 pound of cherries is 0.5 pound of apples.

### Table 2.1

A Summary of the Gains from Trade

<table>
<thead>
<tr>
<th></th>
<th>You (in pounds)</th>
<th>Your Neighbor (in pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production and consumption without trade</strong></td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td><strong>Production with trade</strong></td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td><strong>Consumption with trade</strong></td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td><strong>Gains from trade (increased consumption)</strong></td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 2.2 summarizes the opportunity costs for you and your neighbor of picking apples and cherries. Note that even though your neighbor can pick more apples in a week than you can, the opportunity cost of picking apples is higher for her than for you because when she picks apples, she gives up more cherries than you do. So, even though she has an absolute advantage over you in picking apples, it is more costly for her to pick apples than it is for you. The table also shows that her opportunity cost of picking cherries is lower than your opportunity cost of picking cherries. **Comparative advantage** is the ability of an individual, a firm, or a country to produce a good or service at a lower opportunity cost than competitors. In apple picking, your neighbor has an absolute advantage over you, but you have a comparative advantage over her. Your neighbor has both an absolute advantage and a comparative advantage over you in picking cherries. As we have seen, you are better off specializing in picking apples, and your neighbor is better off specializing in picking cherries.

### Comparative Advantage and the Gains from Trade

We have just derived an important economic principle: *The basis for trade is comparative advantage, not absolute advantage.* The fastest apple pickers do not necessarily do much apple picking. If the fastest apple pickers have a comparative advantage in some other activity—picking cherries, playing Major League Baseball, or being industrial engineers—they are better off specializing in that other activity. Individuals, firms, and countries are better off if they specialize in producing goods and services for which they have a comparative advantage and obtain the other goods and services they need by trading. We will return to the important concept of comparative advantage in Chapter 9, which is devoted to the subject of international trade.

### Don’t Let This Happen to You

**Don’t Confuse Absolute Advantage and Comparative Advantage**

First, make sure you know the definitions:

- **Absolute advantage.** The ability of an individual, a firm, or a country to produce more of a good or service than competitors, using the same amount of resources. In our example, your neighbor has an absolute advantage over you in both picking apples and picking cherries.

- **Comparative advantage.** The ability of an individual, a firm, or a country to produce a good or service at a lower opportunity cost than competitors. In our example, your neighbor has a comparative advantage in picking cherries, but you have a comparative advantage in picking apples.

Keep these two key points in mind:

1. It is possible to have an absolute advantage in producing a good or service without having a comparative advantage. This is the case with your neighbor picking apples.
2. It is possible to have a comparative advantage in producing a good or service without having an absolute advantage. This is the case with you picking apples.

**MyEconLab**

**Your Turn:** Test your understanding by doing related problem 2.5 on page 64 at the end of this chapter.
Chapter 2: Trade-offs, Comparative Advantage, and the Market System

Solved Problem 2.2

Comparative Advantage and the Gains from Trade

Suppose that Canada and the United States both produce maple syrup and honey, which sell for the same prices in both countries. These are the combinations of the two goods that each country can produce in one day using the same amounts of capital and labor:

<table>
<thead>
<tr>
<th></th>
<th>Canada</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honey</td>
<td>Maple Syrup</td>
<td>Honey</td>
</tr>
<tr>
<td>(in tons)</td>
<td>(in tons)</td>
<td>(in tons)</td>
</tr>
<tr>
<td>0</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>

a. Who has a comparative advantage in producing maple syrup? Who has a comparative advantage in producing honey?

b. Suppose that Canada is currently producing 30 tons of honey and 15 tons of maple syrup, and the United States is currently producing 10 tons of honey and 40 tons of maple syrup. Demonstrate that Canada and the United States can both be better off if they specialize in producing only one good and engage in trade.

c. Illustrate your answer to question (b) by drawing a PPF for the United States and a PPF for Canada. Show on your PPFs the combinations of honey and maple syrup produced and consumed in each country before and after trade.

Solving the Problem

Step 1: Review the chapter material. This problem is about comparative advantage, so you may want to review the section “Absolute Advantage versus Comparative Advantage,” which begins on page 48.

Step 2: Answer part (a) by calculating who has a comparative advantage in each activity. Remember that a country has a comparative advantage in producing a good if it can produce the good at the lowest opportunity cost. When Canada produces 1 more ton of honey, it produces 1.5 tons less of maple syrup. When the United States produces 1 more ton of honey, it produces 1 ton less of maple syrup. Therefore, the United States’ opportunity cost of producing honey—1 ton of maple syrup—is lower than Canada’s—1.5 tons of maple syrup. When Canada produces 1 more ton of maple syrup, it produces 0.67 ton less of honey. When the United States produces 1 more ton of maple syrup, it produces 1 ton less of honey. Therefore, Canada’s opportunity cost of producing maple syrup—0.67 ton of honey—is lower than that of the United States—1 ton of honey. We can conclude that the United States has a comparative advantage in the production of honey and Canada has a comparative advantage in the production of maple syrup.

Step 3: Answer part (b) by showing that specialization makes Canada and the United States better off. We know that Canada should specialize where it has a comparative advantage, and the United States should specialize where it has a comparative advantage. If both countries specialize, Canada will produce 60 tons of maple syrup and 0 tons of honey, and the United States will produce 0 tons of maple syrup and 50 tons of honey. After both countries specialize, the United States could then trade 30 tons of honey to Canada in exchange for 40 tons of maple syrup. (Other mutually beneficial trades are possible as well.) We can summarize the results in a table:

<table>
<thead>
<tr>
<th></th>
<th>Before Trade</th>
<th>After Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Honey (in tons)</td>
<td>Maple Syrup (in tons)</td>
</tr>
<tr>
<td>Canada</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>United States</td>
<td>10</td>
<td>40</td>
</tr>
</tbody>
</table>
The United States is better off after trade because it can consume the same amount of maple syrup and 10 more tons of honey. Canada is better off after trade because it can consume the same amount of honey and 5 more tons of maple syrup.

**Step 4:** Answer part (c) by drawing the PPFs.

![Graph showing PPFs for Canada and the United States](image)

**Your Turn:** For more practice, do related problems 2.6 and 2.7 on page 65 at the end of this chapter.

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### The Market System

We have seen that households, firms, and the government face trade-offs and incur opportunity costs because resources are scarce. We have also seen that trade allows people to specialize according to their comparative advantage. By engaging in trade, people can raise their standard of living. Of course, trade in the modern world is much more complex than the examples we have considered so far. Trade today involves the decisions of millions of people around the world. But how does an economy make trade possible, and how are the decisions of these millions of people coordinated? In the United States and most other countries, trade is carried out in markets. Markets also determine the answers to the three fundamental questions discussed in Chapter 1: What goods and services will be produced? How will the goods and services be produced? and Who will receive the goods and services produced?

Recall that the definition of market is a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade. Markets take many forms: They can be physical places, such as a local pizza parlor or the New York Stock Exchange, or virtual places, such as eBay. In a market, the buyers are demanders of goods or services, and the sellers are suppliers of goods or services. Households and firms interact in two types of markets: product markets and factor markets. **Product markets** are markets for goods—such as computers—and services—such as medical treatment. In product markets, households are demanders and firms are suppliers. **Factor markets** are markets for the factors of production. **Factors of production** are the inputs used to make goods and services. Factors of production are divided into four broad categories:

- **Labor** includes all types of work, from the part-time labor of teenagers working at McDonald’s to the work of senior managers in large corporations.
- **Capital** refers to physical capital, such as computers and machine tools, that is used to produce other goods.

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### 2.3 Learning Objective

Explain the basic idea of how a market system works.

**Market** A group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade.

**Product market** A market for goods—such as computers—or services—such as medical treatment.

**Factor market** A market for the factors of production, such as labor, capital, natural resources, and entrepreneurial ability.

**Factors of production** The inputs used to make goods and services.
• Natural resources include land, water, oil, iron ore, and other raw materials (or “gifts of nature”) that are used in producing goods.

• An entrepreneur is someone who operates a business. Entrepreneurial ability is the ability to bring together the other factors of production to successfully produce and sell goods and services.

The Circular Flow of Income

Two key groups participate in markets:

• A household consists of all the individuals in a home. Households are suppliers of factors of production—particularly labor—employed by firms to make goods and services. Households use the income they receive from selling the factors of production to purchase the goods and services supplied by firms. We are familiar with households as suppliers of labor because most people earn most of their income by going to work, which means they are selling their labor services to firms in the labor market. But households own the other factors of production as well, either directly or indirectly, by owning the firms that have these resources. All firms are owned by households. Small firms, like a neighborhood restaurant, might be owned by one person. Large firms, like Microsoft or BMW, are owned by millions of households that own shares of stock in them. (We discuss the stock market in Chapter 8.) When firms pay profits to the people who own them, the firms are paying for using the capital and natural resources that are supplied to them by those owners. So, we can generalize by saying that in factor markets, households are suppliers and firms are demanders.

• Firms are suppliers of goods and services. Firms use the funds they receive from selling goods and services to buy the factors of production needed to make the goods and services.

We can use a simple economic model called the circular-flow diagram to see how participants in markets are linked. Figure 2.6 shows that in factor markets, households supply labor and other factors of production in exchange for wages and other payments from firms. In product markets, households use the payments they earn in factor markets to purchase the goods and services supplied by firms. Firms produce these goods and services using the factors of production supplied by households. In the figure, the blue arrows show the flow of factors of production from households through factor markets to firms. The red arrows show the flow of goods and services from firms through product markets to households. The green arrows show the flow of funds from firms through factor markets to households and the flow of spending from households through product markets to firms.

Like all economic models, the circular-flow diagram is a simplified version of reality. For example, Figure 2.6 leaves out the important role of government in buying goods from firms and in making payments, such as Social Security or unemployment insurance payments, to households. The figure also leaves out the roles played by banks, the stock and bond markets, and other parts of the financial system in aiding the flow of funds from lenders to borrowers. Finally, the figure does not show that some goods and services purchased by domestic households are produced in foreign countries and some goods and services produced by domestic firms are sold to foreign households. (We explore the government, the financial system, and the international sector further in later chapters.) Despite these simplifications, the circular-flow diagram in Figure 2.6 is useful for seeing how product markets, factor markets, and their participants are linked together. One of the great wonders of the market system is that it manages to successfully coordinate the independent activities of so many households and firms.

The Gains from Free Markets

A free market exists when the government places few restrictions on how goods and services can be produced or sold or on how factors of production can be employed.
Governments in all modern economies intervene more than is consistent with a fully free market. In that sense, we can think of the free market as being a benchmark against which we can judge actual economies. There are relatively few government restrictions on economic activity in the United States, Canada, the countries of Western Europe, Hong Kong, Singapore, and Estonia. So these countries come close to the free market benchmark. In countries such as Cuba and North Korea, the free market system has been rejected in favor of centrally planned economies with extensive government control over product and factor markets. Countries that come closest to the free market benchmark have been more successful than countries with centrally planned economies in providing their people with rising living standards.

The Scottish philosopher Adam Smith is considered the father of modern economics because his book *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1776, was an early and very influential argument for the free market system. Smith was writing at a time when extensive government restrictions on markets were still common. In many parts of Europe, the *guild system* still prevailed. Under this system, governments would give guilds, or organizations of producers, the authority to control the production of a good. For example, the shoemakers’ guild controlled who was allowed to produce shoes, how many shoes they could produce, and what price they could charge. In France, the cloth makers’ guild even dictated the number of threads in the weave of the cloth.

Smith argued that such restrictions reduced the income, or wealth, of a country and its people by restricting the quantity of goods produced. Some people at the time supported the restrictions of the guild system because it was in their financial interest to do so. If you were a member of a guild, the restrictions served to reduce the competition
you faced. But other people sincerely believed that the alternative to the guild system was economic chaos. Smith argued that these people were wrong and that a country could enjoy a smoothly functioning economic system if firms were freed from guild restrictions.

The Market Mechanism

In Smith’s day, defenders of the guild system worried that if, for instance, the shoemakers’ guild did not control shoe production, either too many or too few shoes would be produced. Smith argued that prices would do a better job of coordinating the activities of buyers and sellers than the guilds could. A key to understanding Smith’s argument is the assumption that individuals usually act in a rational, self-interested way. In particular, individuals take those actions most likely to make themselves better off financially. This assumption of rational, self-interested behavior underlies nearly all economic analysis. In fact, economics can be distinguished from other fields that study human behavior—such as sociology and psychology—by its emphasis on the assumption of self-interested behavior. Adam Smith understood—as economists today understand—that people’s motives can be complex. But in analyzing people in the act of buying and selling, the motivation of financial reward usually provides the best explanation for the actions people take.

For example, suppose that a significant number of consumers switch from buying regular gasoline-powered cars to buying gasoline/electric-powered hybrid cars, such as the Toyota Prius, as in fact has happened in the United States during the past 10 years. Firms will find that they can charge relatively higher prices for hybrid cars than they can for regular cars. The self-interest of these firms will lead them to respond to consumers’ wishes by producing more hybrids and fewer regular cars. Or suppose that consumers decide that they want to eat less bread, pasta, and other foods high in carbohydrates, as many did following the increase in popularity of the Atkins and South Beach diets. Then the prices firms can charge for bread and pasta will fall. The self-interest of firms will lead them to produce less bread and pasta, which in fact is what happened.

Note that for the market mechanism to work in responding to changes in consumers’ wants, prices must be flexible. Changes in relative prices—that is, the price of one good or service relative to other goods or services—provides information, or a signal, to both consumers and firms. For example, in 2010, consumers worldwide increased their demand for cattle and poultry. Because corn is fed to cattle and poultry, prices for corn soared relative to prices for other crops. Many farmers in the United States received this price signal and responded by increasing the amount of corn they planted and decreasing the amount of soybeans and wheat. One Kansas farmer was quoted as saying, “It seemed to me there was $100 to $150 per acre more money in the corn than there was in the beans. That’s the kind of math that a lot of guys were using.” Similarly, falling prices for DVDs or music CDs in the 2000s was a signal to movie studios and record companies to devote fewer resources to these products and more resources to making movies and music available online. In the United States today, governments at the federal, state, and local levels set or regulate the price of only about 10 to 20 percent of goods and services. The prices of other goods and services are free to change as consumer wants change and as costs of production change.

In the case where consumers want more of a product, and in the case where they want less of a product, the market system responds without a guild or the government giving orders about how much to produce or what price to charge. In a famous phrase, Smith said that firms would be led by the “invisible hand” of the market to provide consumers with what they want. Firms respond individually to changes in prices by making decisions that collectively end up satisfying the wants of consumers.
Making the Connection

A Story of the Market System in Action: How Do You Make an iPad?

Apple produces the iPad 2. Because Apple’s headquarters is in Cupertino, California, it seems reasonable to assume that iPads are also manufactured in that state. In fact, although engineers at Apple designed the iPad, the company produces none of the components of the iPad, nor does it assemble the components into a finished product. Far from being produced entirely by one company in one place, the iPad requires the coordinated activities of thousands of workers and dozens of firms spread around the world.

Foxconn, which is based in Taiwan, assembles the iPad in factories in Shenzhen and Chengdu, China, and ships them to Apple for sale in the United States. Foxconn has announced plans to begin assembling some iPads in a new factory in Brazil by 2012. Although Foxconn does final assembly, it doesn’t make any of the components and, in fact, charges Apple less than $15 for assembling each iPad.

The table below lists just some of the many suppliers of components for the iPad 2.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Location of the Firm</th>
<th>iPad Component the Firm Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>Great Britain</td>
<td>Processor design</td>
</tr>
<tr>
<td>Broadcom</td>
<td>United States (California)</td>
<td>Touchscreen controller</td>
</tr>
<tr>
<td>Infineon Technologies</td>
<td>Germany</td>
<td>Semiconductors</td>
</tr>
<tr>
<td>LG Electronics</td>
<td>South Korea</td>
<td>Screen</td>
</tr>
<tr>
<td>Samsung</td>
<td>South Korea</td>
<td>Flash memory and processor</td>
</tr>
<tr>
<td>Texas Instruments</td>
<td>United States (Texas)</td>
<td>Touchscreen controller</td>
</tr>
</tbody>
</table>

Each of these suppliers in turn relies on its own suppliers. For example, Broadcom designs the touchscreen controller for the iPad and supplies it to Apple, but it does not manufacture the components of the controller or assemble them. To manufacture the components, Broadcom relies on SiTerra, based in Malaysia; SMIC, based in mainland China; and Taiwan Semiconductor Manufacturing Corporation (TSMC) and UMC, based in Taiwan. TSMC’s factories are for the most part not in Taiwan but in mainland China and Eastern Europe. To assemble the components, Broadcom uses several companies, including Amkor Technology, based in Chandler, Arizona, and STATS ChipPAC, based in Singapore.

All told, an iPad contains hundreds of parts that are designed, manufactured, and assembled by firms around the world. Many of these firms are not even aware of which other firms are also producing components for the iPad. Few of the managers of these firms have met managers of the other firms or shared knowledge of how their particular components are produced. In fact, no one person from Tim Cook, the chief executive officer of Apple, on down possesses the knowledge of how to produce all the components that are assembled into an iPad. Instead, the invisible hand of the market has led these firms to contribute their knowledge and resources to the process that ultimately results in an iPad available for sale in a store in the United States. Apple has so efficiently organized the process of producing the iPad that you can order a custom iPad with a personal engraving and have it delivered from an assembly plant in China to your doorstep in the United States in as little as three days.


Your Turn: Test your understanding by doing related problems 3.8 and 3.9 on page 66 at the end of this chapter.
The Role of the Entrepreneur

Entrepreneurs are central to the working of the market system. An entrepreneur is someone who operates a business. Entrepreneurs must first determine what goods and services they believe consumers want, and then they must decide how to produce those goods and services most profitably, using the available factors of production—labor, capital, and natural resources. Successful entrepreneurs are able to search out opportunities to provide new goods and services. Often these opportunities are created by new technology. Consumers and existing businesses typically do not at first realize that the new technology makes new products feasible. For example, even after the development of the internal combustion engine had made automobiles practicable, Henry Ford remarked, “If I had asked my customers what they wanted, they would have said a faster horse.” Because consumers often cannot evaluate a new product before it exists, some of the most successful entrepreneurs, such as the late Steve Jobs of Apple, rarely use focus groups, or meetings with consumers in which the customers are asked what new products they would like to see. Instead, entrepreneurs think of products that consumers may not even realize they need, such as, in Jobs’s case, an MP3 player—iPod—or a tablet computer—iPad.

Entrepreneurs are of great importance to the economy because they are often responsible for making new products widely available to consumers, as Henry Ford did with the automobile and Steve Jobs did with the iPod. Table 2.3 lists some of the important products entrepreneurs at small firms introduced during the twentieth century.

Table 2.3

<table>
<thead>
<tr>
<th>Product</th>
<th>Inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning</td>
<td>William Haviland Carrier</td>
</tr>
<tr>
<td>Airplane</td>
<td>Orville and Wilbur Wright</td>
</tr>
<tr>
<td>Biomagnetic imaging</td>
<td>Raymond Damadian</td>
</tr>
<tr>
<td>Biosynthetic insulin</td>
<td>Herbert Boyer</td>
</tr>
<tr>
<td>DNA fingerprinting</td>
<td>Alec Jeffries</td>
</tr>
<tr>
<td>FM radio</td>
<td>Edwin Howard Armstrong</td>
</tr>
<tr>
<td>Helicopter</td>
<td>Igor Sikorsky</td>
</tr>
<tr>
<td>High-resolution CAT scanner</td>
<td>Robert Ledley</td>
</tr>
<tr>
<td>Hydraulic brake</td>
<td>Malcolm Lockheed</td>
</tr>
<tr>
<td>Integrated circuit</td>
<td>Jack Kilby</td>
</tr>
<tr>
<td>Microprocessor</td>
<td>Ted Hoff</td>
</tr>
<tr>
<td>Optical scanner</td>
<td>Everett Franklin Lindquist</td>
</tr>
<tr>
<td>Oral contraceptives</td>
<td>Carl Djerassi</td>
</tr>
<tr>
<td>Overnight delivery service</td>
<td>Fred Smith</td>
</tr>
<tr>
<td>Personal computer</td>
<td>Steve Jobs and Steve Wozniak</td>
</tr>
<tr>
<td>Quick-frozen foods</td>
<td>Clarence Birdseye</td>
</tr>
<tr>
<td>Safety razor</td>
<td>King Gillette</td>
</tr>
<tr>
<td>Soft contact lens</td>
<td>Kevin Tuohy</td>
</tr>
<tr>
<td>Solid fuel rocket engine</td>
<td>Robert Goddard</td>
</tr>
<tr>
<td>Supercomputer</td>
<td>Seymour Cray</td>
</tr>
<tr>
<td>Vacuum tube</td>
<td>Philo Farnsworth</td>
</tr>
<tr>
<td>Zipper</td>
<td>Gideon Sundback</td>
</tr>
</tbody>
</table>

Based on William J. Baumol, The Microtheory of Innovative Entrepreneurship, (Princeton, NJ: Princeton University Press, 2010) and various sources. Note that the person who first commercially developed a particular product is sometimes disputed by historians.
Entrepreneurs put their own funds at risk when they start businesses. If they are wrong about what consumers want or about the best way to produce goods and services, they can lose those funds. In fact, it is not unusual for entrepreneurs who eventually achieve great success to fail at first. For instance, early in their careers, both Henry Ford and Sakichi Toyoda, who eventually founded the Toyota Motor Corporation, started companies that quickly failed. Research by Richard Freeman of Harvard University has shown that the typical entrepreneur earns less than someone with the same education and other characteristics who is an employee at a large firm. Few entrepreneurs make the fortunes earned by Henry Ford, Steve Jobs, or Bill Gates.

Entrepreneurs make a vital contribution to economic growth through their roles in responding to consumer demand and in introducing new products. So, government policies that encourage entrepreneurship are also likely to increase economic growth and raise the standard of living. In the next section, we consider the legal framework required for a successful market in which entrepreneurs can succeed.

The Legal Basis of a Successful Market System

In a free market, government does not restrict how firms produce and sell goods and services or how they employ factors of production. But the absence of government intervention is not enough for the market system to work well. Government has to take active steps to provide a legal environment that will allow the market system to succeed.

**Protection of Private Property** For the market system to work well, individuals must be willing to take risks. Someone with $250,000 can be cautious and keep it safely in a bank—or even in cash, if the person doesn’t trust banks. But the market system won’t work unless a significant number of people are willing to risk their funds by investing them in businesses. Investing in businesses is risky in any country. Many businesses fail every year in the United States and other high-income countries. But in high-income countries, someone who starts a new business or invests in an existing business doesn’t have to worry that the government, the military, or criminal gangs might decide to seize the business or demand payments for not destroying the business. Unfortunately, in many poor countries, owners of businesses are not well protected from having their businesses seized by the government or from having their profits taken by criminals. Where these problems exist, opening a business can be extremely risky. Cash can be concealed easily, but a business is difficult to conceal and difficult to move.

**Property rights** are the rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it. Property can be tangible, physical property, such as a store or factory. Property can also be intangible, such as the right to an idea. Two amendments to the U.S. Constitution guarantee property rights: The 5th Amendment states that the federal government shall not deprive any person “of life, liberty, or property, without due process of law.” The 14th Amendment extends this guarantee to the actions of state governments: “No state . . . shall deprive any person of life, liberty, or property, without due process of law.” Similar guarantees exist in every high-income country. Unfortunately, in many developing countries, such guarantees do not exist or are poorly enforced.

In any modern economy, *intellectual property rights* are very important. Intellectual property includes books, films, software, and ideas for new products or new ways of producing products. To protect intellectual property, the federal government grants a *patent* that gives an inventor—which is often a firm—the exclusive right to produce and sell a new product for a period of 20 years from the date the patent was filed. For instance, because Microsoft has a patent on the Windows operating system, other firms cannot sell their own versions of Windows. The government grants patents to encourage firms to spend money on the research and development necessary to create new products. If other companies could freely copy Windows, Microsoft would not have spent the funds necessary to develop it. Just as a new product or a new method of making a product receives patent protection, books, films, and software receive *copyright* protection. Under U.S. law, the creator of a book, film, or piece of music has the exclusive right to use the
creation during the creator’s lifetime. The creator’s heirs retain this exclusive right for 50 years after the death of the creator.

**Enforcement of Contracts and Property Rights** Business activity often involves someone agreeing to carry out some action in the future. For example, you may borrow $20,000 to buy a car and promise the bank—by signing a loan contract—that you will pay back the money over the next five years. Or Microsoft may sign a licensing agreement with a small technology company, agreeing to use that company’s technology for a period of several years in return for a fee. Usually these agreements take the form of legal contracts. For the market system to work, businesses and individuals have to rely on these contracts being carried out. If one party to a legal contract does not fulfill its obligations—perhaps the small company had promised Microsoft exclusive use of its technology but then began licensing it to other companies—the other party can go to court to have the agreement enforced. Similarly, if property owners in the United States believe that the federal or state government has violated their rights under the 5th or 14th Amendments, they can go to court to have their rights enforced.

But going to court to enforce a contract or private property rights will be successful only if the court system is independent and judges are able to make impartial decisions on the basis of the law. In the United States and other high-income countries, the court systems have enough independence from other parts of the government and enough protection from intimidation by outside forces—such as criminal gangs—that they are able to make their decisions based on the law. In many developing countries, the court systems lack this independence and will not provide a remedy if the government violates private property rights or if a person with powerful political connections decides to violate a business contract.

If property rights are not well enforced, fewer goods and services will be produced. This reduces economic efficiency, leaving the economy inside its production possibilities frontier.

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**Continued from page 39**

**Economics in Your Life**

**The Trade-offs When You Buy a Car**

At the beginning of the chapter, we asked you to think about two questions: When buying a new car, what is the relationship between safety and fuel efficiency? and Under what circumstances would it be possible for automobile manufacturers to make cars safer and more fuel efficient? To answer the first question, you have to recognize that there is a trade-off between safety and fuel efficiency. With the technology available at any particular time, an automobile manufacturer can increase fuel efficiency by making a car smaller and lighter. But driving a lighter car increases your chances of being injured if you have an accident. The trade-off between safety and fuel efficiency would look much like the relationship in Figure 2.1 on page 41. To get more of both safety and gas mileage, automobile makers would have to discover new technologies that allow them to make cars lighter and safer at the same time. Such new technologies would make points like \( G \) in Figure 2.1 attainable.
Conclusion

We have seen that by trading in markets, people are able to specialize and pursue their comparative advantage. Trading on the basis of comparative advantage makes all participants in trade better off. The key role of markets is to facilitate trade. In fact, the market system is a very effective means of coordinating the decisions of millions of consumers, workers, and firms. At the center of the market system is the consumer. To be successful, firms must respond to the desires of consumers. These desires are communicated to firms through prices. To explore how markets work, we must study the behavior of consumers and firms. We continue this exploration of markets in Chapter 3, when we develop the model of demand and supply.

Before moving on to Chapter 3, read An Inside Look on the next page for a discussion of the trade-offs General Motors faces in producing its electric cars, the Chevy Volt and the Cadillac Converj.
An Inside Look

Managers at General Motors Approve Production of a Plug-in Cadillac

GREEN CAR REPORTS

Cadillac Reportedly to Build Chevy Volt–Based Car

Sometimes, like Lazarus, dead cars rise again.

We’ve learned from an inside source at General Motors, a person close to the project, that the electric Cadillac Converj luxury coupe is now back in the GM product plan.

The Converj was recently approved for production by GM product executives. It will likely launch in 2013 as a 2014 model, though it may end up with a Cadillac-style three-letter model name.

The production version will feature, says our source, “a Generation 1.5 Voltec” powertrain.

That would be an updated version of the extended-range electric powertrain from the 2011 Chevrolet Volt, possibly with better acceleration to suit the Cadillac image—but not the fully revised second-generation version that will go into production in 2015.

Smash hit in 2009

The Converj concept car was first unveiled in January 2009 at the Detroit Auto Show. The sleek sports coupe received rave reviews, and during 2009, it was approved for production, with then-product chief Bob Lutz saying in January 2010 it had been cleared by management.

Two months later, it was killed, with Cadillac spokesman David Caldwell saying the Converj program had not reached “a point [at] which development would be occurring in earnest in any case.”

Two reasons were given for ending the program almost 18 months ago: First, GM could not make a profit at the low volumes the Converj had been planned for.

Now, with the Volt essentially sold out and GM trying to boost production as fast as possible, perhaps Converj volumes can go higher, meaning each car may cost less.

Second, product planners were concerned that the greater weight and additional luxury features of a Cadillac would cut its electric range and performance—reducing its appeal, much as the Lexus HS 250h has sold in lower numbers than expected for Toyota’s luxury arm.

“All about profit”

Apparently, both concerns have been resolved. One reason for resuscitating the Converj, says our source, is that CEO Dan Akerson is “all about profit.” The 2012 Volt lists at $39,990, and tops out (before dealer markup) at less than $50,000.

If some Voltec cars could be sold not for $45,000 but, say, $60,000, that might enable GM to make money on its first generation of Voltec cars. Or, perhaps more realistically, to lose less money on the technology—until a less-costly second generation can be rolled out.

And if Cadillac truly hopes to compete with the likes of Mercedes-Benz, BMW, and Audi, it needs to have one or more plug-in offerings.

All those makes have multiple plug-ins planned, from the Mercedes-Benz S-Class Plug-In Hybrid and Audi e-tron electric supercar down to the A-Class E-Cell and tiny Audi Urban Concept two-seater.

Escalade Hybrid: hardly a halo car

But despite a plug-in hybrid concept for the XTS full-size sedan that will go on sale next spring as a 2013 model, and persistent rumors of an SRX plug-in hybrid crossover, neither of those products has been given the green light for production.

The SRX plug-in hybrid was killed in May due to inadequate range from its battery pack, which had been designed for a different and lighter vehicle. So Cadillac’s sole electrified vehicle remains the 2011 Escalade Hybrid full-size sport-utility vehicle—hardly a halo car to get early adopters into their dealers, as the Volt has done for Chevy.

The Converj is not the only example of turbulence in GM’s product plans over the last three years. But now that a deal has been reached to raise corporate average fuel-economy standards to 54.5 mpg by 2025, insiders hope that the GM product plan will settle down.

To reach those goals, plug-in cars will clearly become a larger portion of GM’s portfolio over time.

Key Points in the Article

This article discusses General Motors’s plan to produce an electric car for its Cadillac brand with an upgrade of the powertrain technology currently in use in its Chevy Volt plug-in car. GM introduced a concept version of this Cadillac model in 2009, and after positive reviews, it was approved for production, only to be shelved two months later amid concerns about profitability and performance. High demand for the Volt and improvements to the Voltec powertrain alleviated the profitability and performance concerns, and GM again approved production of the Cadillac model, with a planned introduction in 2013. GM views production of an electric plug-in vehicle as essential for Cadillac in its effort to compete with other luxury automobile brands that have plug-in vehicles in the planning stages.

Analyzing the News

Based on positive reaction to the Cadillac Converj concept vehicle in 2009, GM officials approved the car for production, but concerns, including its initial limited production estimates, caused GM to reverse course and cancel its plans. Subsequently, high demand for the Volt led GM to increase production of the Voltec powertrain. This increased production of powertrains caused GM to increase its initial production estimates of the Cadillac at a potentially lower per-unit cost, again making the production version viable. If we assume that in 2009 the resources available to GM to produce its Voltec powertrain were fixed, and 10,000 could be produced, then GM must decide how to allocate those resources between producing powertrains for its Chevy and for its Cadillac. In the figure below, we illustrate the trade-off GM faces with a production possibilities frontier. In 2009, we will assume that GM was at point A, devoting 8,000 powertrains for its already-approved Volt and only 2,000 for its newly approved Converj. At point A, GM decided that the small quantity of powertrains that could be devoted to the Converj was insufficient to meet profitability goals and that the production would be better devoted entirely to the Volt, thereby moving production from point A to point B.

When announcing that the Converj would become a production car in 2013, GM had determined that its increased production of the Voltec powertrain and the possibility of charging a higher selling price for Voltec vehicles could increase the profit potential for these vehicles. By 2013, when it expects to start selling the Converj, GM will have allocated additional resources and employed improved technology to the production of the Voltec powertrain, allowing the company to increase its production numbers. Assume that in 2013 GM is capable of producing 30,000 Voltec powertrains. This is represented in the figure below by the production possibilities frontier shifting out, allowing GM to devote more powertrains to both the Volt and the Converj. In the figure, we assume that GM will move to point C and will allocate 22,000 powertrains to production of the Volt and 8,000 to the Converj.

GM still has reservations about approving additional electric models for its Cadillac brand, citing performance concerns for these heavier vehicles. For GM to choose to devote additional resources to address these concerns, it would need to allocate fewer resources to its current production. Companies can weigh the opportunity costs of devoting their limited resources to their various production alternatives to help determine the allocation of resources.

Thinking Critically

1. Suppose that from 2009 to 2013, the resources GM uses to produce the Voltec powertrain remained constant, but improvements in technology allow GM in 2013 to produce the additional quantity of powertrains shown in the figure for only the Cadillac Converj but not the Chevy Volt. Draw a graph that illustrates this technology change, showing both the 2009 and new 2013 production possibilities frontiers. What is the opportunity cost of producing one powertrain for the Volt in 2009? In 2013?

2. Assume that the figure accurately represents GM’s production possibilities frontiers for 2009 and 2013, and in 2013 it has customer orders for 25,000 Volts and 10,000 Converjs. Explain whether GM can fill all of these orders.
Chapter Summary and Problems

Key Terms

Absolute advantage, p. 48  Factor market, p. 51  Product market, p. 51  Scarcity, p. 40
Circular-flow diagram, p. 52  Factors of production, p. 51  Production possibilities frontier (PPF), p. 40  Trade, p. 46
Comparative advantage, p. 49  Free market, p. 52  Market, p. 51
Economic growth, p. 46  Opportunity cost, p. 41
Entrepreneur, p. 56

Production Possibilities Frontiers and Opportunity Costs, pages 40–46
LEARNING OBJECTIVE: Use a production possibilities frontier to analyze opportunity costs and trade-offs.

Summary

The production possibilities frontier (PPF) is a curve that shows the maximum attainable combinations of two products that may be produced with available resources. The PPF is used to illustrate the trade-offs that arise from scarcity. Points on the frontier are technically efficient. Points inside the frontier are inefficient, and points outside the frontier are unattainable. The opportunity cost of any activity is the highest-valued alternative that must be given up to engage in that activity. Because of increasing marginal opportunity costs, production possibilities frontiers are usually bowed out rather than straight lines. This illustrates the important economic concept that the more resources that are already devoted to any activity, the smaller the payoff from devoting additional resources to that activity is likely to be. Economic growth is illustrated by shifting a production possibilities frontier outward.

Review Questions

1.1 What do economists mean by scarcity? Can you think of anything that is not scarce according to the economic definition?
1.2 What is a production possibilities frontier? How can we show economic efficiency on a production possibilities frontier? How can we show inefficiency? What causes a production possibilities frontier to shift outward?
1.3 What does increasing marginal opportunity costs mean? What are the implications of this idea for the shape of the production possibilities frontier?

Problems and Applications

1.4 Draw a production possibilities frontier that shows the trade-off between the production of cotton and the production of soybeans.
   a. Show the effect that a prolonged drought would have on the initial production possibilities frontier.
   b. Suppose genetic modification makes soybeans resistant to insects, allowing yields to double. Show the effect of this technological change on the initial production possibilities frontier.

1.5 [Related to the Chapter Opener on page 39] One of the trade-offs BMW faces is between safety and gas mileage. For example, adding steel to a car makes it safer but also heavier, which results in lower gas mileage. Draw a hypothetical production possibilities frontier that BMW engineers face that shows this trade-off.

1.6 Suppose you win free tickets to a movie plus all you can eat at the snack bar for free. Would there be a cost to you to attend this movie? Explain.

1.7 Suppose we can divide all the goods produced by an economy into two types: consumption goods and capital goods. Capital goods, such as machinery, equipment, and computers, are goods used to produce other goods.
   a. Use a production possibilities frontier graph to illustrate the trade-off to an economy between producing consumption goods and producing capital goods. Is it likely that the production possibilities frontier in this situation would be a straight line (as in Figure 2.1 on page 41) or bowed out (as in Figure 2.2 on page 44)? Briefly explain.
   b. Suppose a technological change occurs that has a favorable effect on the production of capital goods but not consumption goods. Show the effect on the production possibilities frontier.
   c. Suppose that country A and country B currently have identical production possibilities frontiers but that country A devotes only 5 percent of its resources to producing capital goods over each of the next 10 years, whereas country B devotes 30 percent. Which country is likely to experience more rapid economic growth in the future? Illustrate using a production possibilities frontier graph. Your graph should include production possibilities frontiers for country A today and in 10 years and production possibilities frontiers for country B today and in 10 years.
1.8 Use the following production possibilities frontier for a country to answer the questions.

[Diagram of production possibilities frontier]

a. Which point or points are unattainable? Briefly explain why.
b. Which point or points are efficient? Briefly explain why.
c. Which point or points are inefficient? Briefly explain why.
d. At which point is the country’s future growth rate likely to be the highest? Briefly explain why.

1.9 [Related to Solved Problem 2.1 on page 42] You have exams in economics and chemistry coming up, and you have five hours available for studying. The following table shows the trade-offs you face in allocating the time you will spend in studying each subject:

<table>
<thead>
<tr>
<th>Hours Spent Studying</th>
<th>Midterm Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Economics</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

a. Use the data in the table to draw a production possibilities frontier graph. Label the vertical axis “Score on economics exam,” and label the horizontal axis “Score on chemistry exam.” Make sure to label the values where your production possibilities frontier intersects the vertical and horizontal axes.
b. Label the points representing choice C and choice D. If you are at choice C, what is your opportunity cost of increasing your chemistry score?
c. Under what circumstances would choice A be a sensible choice?

1.10 [Related to the Making the Connection on page 43] Suppose the U.S. president is attempting to decide whether the federal government should spend more on research to find a cure for heart disease. He asks you, one of his economic advisors, to prepare a report discussing the relevant factors he should consider. Use the concepts of opportunity cost and trade-offs to discuss some of the main issues you would deal with in your report.

1.11 [Related to the Making the Connection on page 43] Uwe Reinhardt, an economist at Princeton University, wrote the following in a column in the New York Times:

“Cost-effectiveness analysis” seeks to establish which of several alternative strategies capable of achieving a given therapeutic goal is the least-cost strategy. It seems a sensible form of inquiry in a nation that is dismayed over the rising cost of health care. . . . Opponents of cost-effectiveness analysis include individuals who sincerely believe that health and life are “priceless.”

Are health and life priceless? Are there any decisions you make during your everyday life that indicate whether you consider health and life to be priceless?


1.12 [Related to the Making the Connection on page 43] Suppose that the federal government is deciding which of two cancer treatment therapies it will allow Medicare to pay for (assuming that only one treatment therapy will be funded): Therapy A, which will prolong the average life span of patients receiving the treatment by 24 months and will cost $750,000 per patient treated, and Therapy B, which will prolong the average life span of patients receiving the treatment by 20 months and will cost $25,000 per patient treated. What factors should the federal government take into consideration in making its decision?

1.13 [Related to the Making the Connection on page 43] Lawrence Summers served as secretary of the treasury in the Clinton administration from 1999 to 2001 and as director of the National Economic Council in the Obama administration from 2009 to 2010. He has been quoted as giving the following moral defense of the economic approach:

There is nothing morally unattractive about saying: We need to analyze which way of spending money on health care will produce more benefit and which less, and using our money as efficiently as we can. I don’t think there is anything immoral about seeking to achieve environmental benefits at the lowest possible costs.

Would it be more ethical to reduce pollution without worrying about the cost or by taking the cost into account? Briefly explain.


1.14 In The Wonderful Wizard of Oz and his other books about the Land of Oz, L. Frank Baum observed that if people's
wants were limited enough, most goods would not be scarce. According to Baum, this was the case in Oz:

There were no poor people in the Land of Oz, because there was no such thing as money. . . . Each person was given freely by his neighbors whatever he required for his use, which is as much as anyone may reasonably desire. Some tilled the lands and raised great crops of grain, which was divided equally among the whole population, so that all had enough. There were many tailors and dressmakers and shoemakers and the like, who made things that any who desired them might wear. Likewise there were jewelers who made ornaments for the person, which pleased and beautified the people, and these ornaments also were free to those who asked for them. Each man and woman, no matter what he or she produced for the good of the community, was supplied by the neighbors with food and clothing and a house and furniture and ornaments and games. If by chance the supply ever ran short, more was taken from the great storehouses of the Ruler, which were afterward filled up again when there was more of any article than people needed. . . . You will know, by what I have told you here, that the Land of Oz was a remarkable country. I do not suppose such an arrangement would be practical with us.

Do you agree with Baum that the economic system in Oz wouldn’t work in the contemporary United States? Briefly explain why or why not.


### 2.2 Comparative Advantage and Trade, pages 46–51

**LEARNING OBJECTIVE:** Understand comparative advantage and explain how it is the basis for trade.

#### Summary

Fundamentally, markets are about trade, which is the act of buying or selling. People trade on the basis of comparative advantage. An individual, a firm, or a country has a comparative advantage in producing a good or service if it can produce the good or service at the lowest opportunity cost. People are usually better off specializing in the activity for which they have a comparative advantage and trading for the other goods and services they need. It is important not to confuse comparative advantage with absolute advantage. An individual, a firm, or a country has an absolute advantage in producing a good or service if it can produce more of that good or service using the same amount of resources. It is possible to have an absolute advantage in producing a good or service without having a comparative advantage.

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#### Review Questions

2.1 What is absolute advantage? What is comparative advantage? Is it possible for a country to have a comparative advantage without also having an absolute advantage? Briefly explain.

2.2 What is the basis for trade: absolute advantage or comparative advantage? How can an individual or a country gain from specialization and trade?

#### Problems and Applications

2.3 Look again at the information in Figure 2.4 on page 47. Choose a rate of trading cherries for apples different from the rate used in the text (15 pounds of cherries for 10 pounds of apples) that will allow you and your neighbor to benefit from trading apples and cherries. Prepare a table like Table 2.1 on page 48 to illustrate your answer.

2.4 Using the same amount of resources, the United States and Canada can both produce lumberjack shirts and lumberjack boots, as shown in the following production possibilities frontiers:

![Production Possibilities Frontier](chart)

<table>
<thead>
<tr>
<th>Quantity of shirts made</th>
<th>United States</th>
<th>Quantity of shirts made</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

a. Who has a comparative advantage in producing lumberjack boots? Who has a comparative advantage in producing lumberjack shirts? Explain your reasoning.

b. Does either country have an absolute advantage in producing both goods? Explain.

c. Suppose that both countries are currently producing three pairs of boots and three shirts. Show that both can be better off if they each specialize in producing one good and then engage in trade.

2.5 ([Related to Don’t Let This Happen to You on page 49](#)) In the 1950s, the economist Bela Balassa compared 28 manufacturing industries in the United States and Britain. In
Summary

A market is a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade. Product markets are markets for goods and services, such as computers and medical treatment. Factor markets are markets for the factors of production, such as labor, capital, natural resources, and entrepreneurial ability. A circular-flow diagram shows how participants in product markets and factor markets are linked. Adam Smith argued in his 1776 book *The Wealth of Nations* that in a free market, where the government does not control the production of goods and services, changes in prices lead firms to produce the goods and services most desired by consumers. If consumers demand more of a good, its price will rise. Firms respond to rising prices by increasing production. If consumers demand less of a good, its price will fall. Firms respond to falling

2.6 [Related to Solved Problem 2.2 on page 50] Suppose Iran and Iraq both produce oil and olive oil, which sell for the same prices in both countries. The following table shows combinations of both goods that the United States can produce in a day, measured in thousands of barrels:

<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Olive Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iran</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Iraq</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

a. Who has the comparative advantage in producing oil? Explain.
b. Can these two countries gain from trading oil and olive oil? Explain.

2.7 [Related to Solved Problem 2.2 on page 50] Suppose that France and Germany both produce schnitzel and wine. The following table shows combinations of the goods that each country can produce in a day:

<table>
<thead>
<tr>
<th></th>
<th>Wine (bottles)</th>
<th>Schnitzel (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Germany</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

a. Who has a comparative advantage in producing wine? Who has a comparative advantage in producing schnitzel? b. Suppose that France is currently producing 1 bottle of wine and 6 pounds of schnitzel, and Germany is currently producing 3 bottles of wine and 6 pounds of schnitzel. Demonstrate that France and Germany can both be better off if they specialize in producing only one good and then engage in trade.

2.8 Can an individual or a country produce beyond its production possibilities frontier? Can an individual or a country consume beyond its production possibilities frontier? Explain.

2.9 If Country A can produce with the same amount of resources twice as much coffee as Country B, explain how Country B could have the comparative advantage in producing coffee.

2.10 Imagine that the next time the Indianapolis Colts play the New England Patriots at Lucas Oil Stadium in Indianapolis, Colts star quarterback Peyton Manning has a temporary lack of judgment and plans to sell Colts memorabilia during the game because he realizes that he can sell five times more Colts products than any other player. Likewise, imagine that you are a creative and effective manager at work and that you tell your employees that during the next six months, you plan to clean the offices because you can clean five times better than the cleaning staff. What error in judgment are both Peyton and you making? Why shouldn’t you do what you are better than anyone else at doing?

2.11 Is specialization and trade between individuals and countries more about having a job or about obtaining a higher standard of living? Individually, if you go from a situation of not trading with others (you produce everything yourself) to a situation of trading with others, do you still have a job? Does your standard of living increase? Likewise, if a country goes from not trading with other countries to trading with other countries, does it still have jobs? Does its standard of living increase?

2.12 In colonial America, the population was spread thinly over a large area, and transportation costs were very high because it was difficult to ship products by road for more than short distances. As a result, most of the free population lived on small farms, where they not only grew their own food but also usually made their own clothes and very rarely bought or sold anything for money. Explain why the incomes of these farmers were likely to rise as transportation costs fell. Use the concept of comparative advantage in your answer.

2.13 During the 1928 presidential election campaign, Herbert Hoover, the Republican candidate, argued that the United States should import only products that could not be produced here. Do you believe that this would be a good policy? Explain.
prices by producing less of a good. An entrepreneur is someone who operates a business. In the market system, entrepreneurs are responsible for organizing the production of goods and services. The market system will work well only if there is protection for property rights, which are the rights of individuals and firms to use their property.

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Review Questions

3.1 What is a circular-flow diagram, and what does it demonstrate?
3.2 What are the two main categories of participants in markets? Which participants are of greatest importance in determining what goods and services are produced?
3.3 What is a free market? In what ways does a free market economy differ from a centrally planned economy?
3.4 What is an entrepreneur? Why do entrepreneurs play a key role in a market system?
3.5 Under what circumstances are firms likely to produce more of a good or service? Under what circumstances are firms likely to produce less of a good or service?
3.6 What are private property rights? What role do they play in the working of a market system? Why are independent courts important for a well-functioning economy?

Problems and Applications

3.7 Identify whether each of the following transactions will take place in the factor market or in the product market and whether households or firms are supplying the good or service or demanding the good or service:
   a. George buys a BMW X6 hybrid.
   b. BMW increases employment at its Spartanburg plant.
   c. George works 20 hours per week at McDonald's.
   d. George sells land he owns to McDonald's so it can build a new restaurant.

3.8 [Related to the Making the Connection on page 55]
   In The Wealth of Nations, Adam Smith wrote the following (Book I, Chapter II): "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest." Briefly discuss what he meant by this.

3.9 [Related to the Making the Connection on page 55]
   According to an article in the Wall Street Journal, the parts contained in the BlackBerry Torch smartphone include a power management chip made by Texas Instruments (United States), a memory chip made by Samsung (South Korea), a GPS receiver made by CSR (United Kingdom), a radio frequency (RF) transceiver made by Dialog Semiconductor (Germany), an RF transceiver made by Renesas (Japan), an application and communications processor made by Marvell (United States), a video image processor made by STMicroelectronics (Switzerland), and plastic and stamped metal parts made by several firms in China. A firm in Mexico carries out final assembly of the Torch before it is shipped to BlackBerry for sale in the United States and other countries. Is it necessary for the managers in all of these firms to know how the components of the Torch are manufactured and how the components are assembled into a smartphone? Is it necessary for the chief executive officer (CEO) of BlackBerry to know this information? Briefly explain.


3.10 In many parts of Europe during the mid-1770s, governments gave guilds, or organizations of producers, the authority to control who was allowed to produce a good, the amount of the good produced, and the price charged for the good. Would you expect more competition among producers in a guild system or in a market system? Was the consumer or the producer at the center of the guild system, and which is at the center of the market system? How would the two systems compare over time in terms of innovation of new products and technologies?

3.11 In a speech at the New York University Law School, Federal Reserve Chairman Ben Bernanke stated:
   Writing in the eighteenth century, Adam Smith conceived of the free-market system as an “invisible hand” that harnesses the pursuit of private interest to promote the public good. Smith’s conception remains relevant today, notwithstanding the enormous increase in economic complexity since the Industrial Revolution. Briefly explain the idea of the invisible hand. What’s so important about the idea of the invisible hand?


3.12 Evaluate the following argument: "Adam Smith’s analysis is based on a fundamental flaw: He assumes that people are motivated by self-interest. But this isn’t true. I’m not selfish, and most people I know aren’t selfish."

3.13 Writing in the New York Times, Michael Lewis argued that "a market economy is premised on a system of incentives designed to encourage an ignoble human trait: self-interest." Do you agree that self-interest is an "ignoble human trait"? What incentives does a market system provide to encourage self-interest?


3.14 Some economists have been puzzled that although entrepreneurs take on the risk of losing time and money by starting new businesses, on average their incomes are lower than those of people with similar characteristics who go to work at large firms. Economist William Baumol believes part of the explanation for this puzzle may be that entrepreneurs are like people who buy lottery tickets. On average, people who don’t buy lottery tickets are left with more money than people who buy tickets because lotteries take in more money than they give out. Baumol argues that "the masses of purchasers who grab up the [lottery] tickets
are not irrational if they receive an adequate payment in another currency: psychic rewards."
a. What are "psychic rewards"?
b. What psychic rewards might an entrepreneur receive?
c. Do you agree with Baumol that an entrepreneur is like someone buying a lottery ticket? Briefly explain.

3.15 The 2009 International Property Rights Index study states:
Data shows that countries that protect the physical and intellectual property of their people enjoy nearly nine times higher [income per person] . . . than countries ranking lowest in property rights protections. The study . . . compared the protections of physical and intellectual property to economic stability in 115 countries . . .
How would the creation of property rights be likely to affect the economic opportunities available to citizens of those countries ranking lowest in property rights protections?